Multi-Level Approaches to Targeting Health Disparities in The United States

20th National Symposium
on Doctoral Research in Social Work
April 26, 2008

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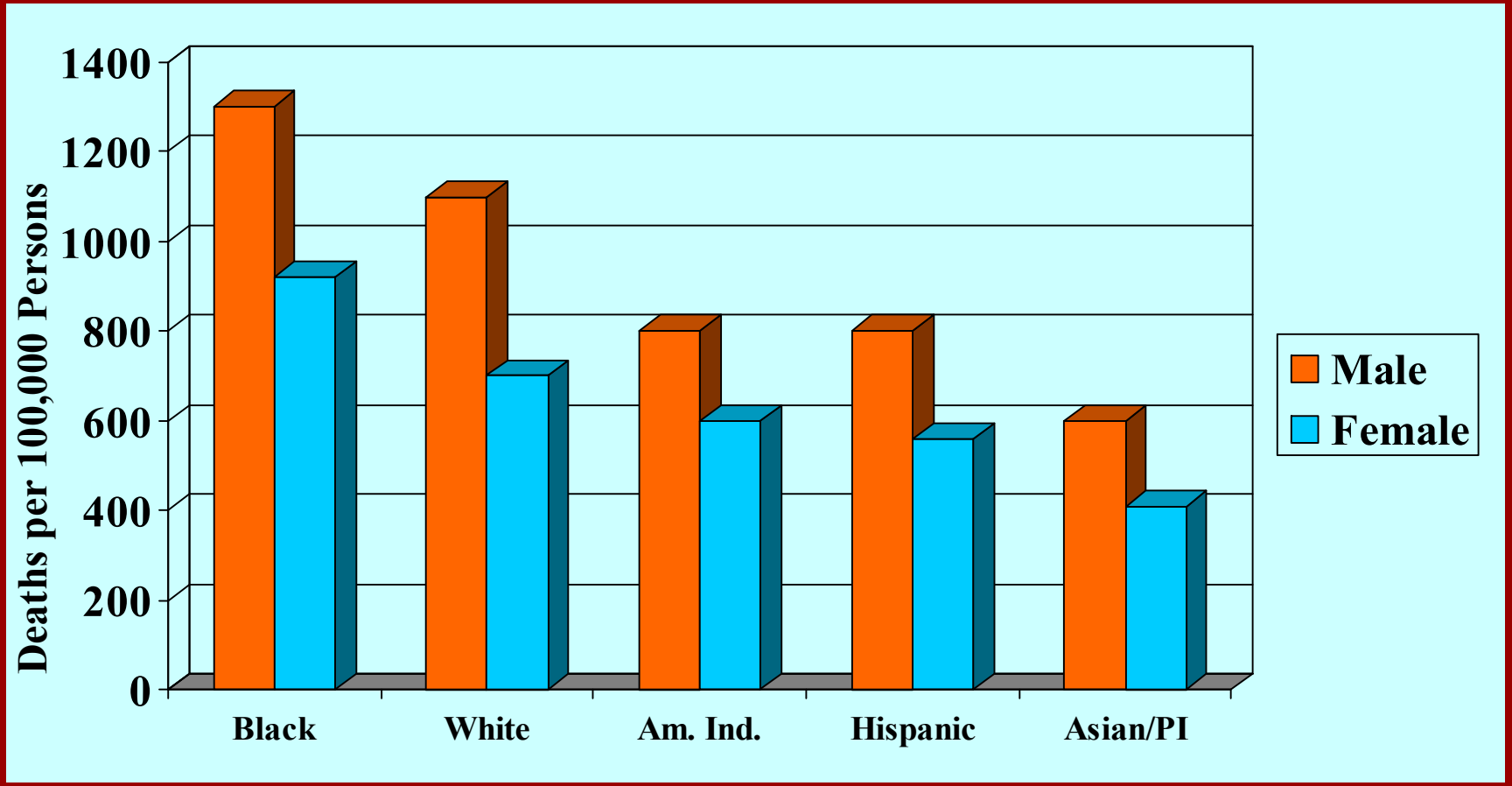
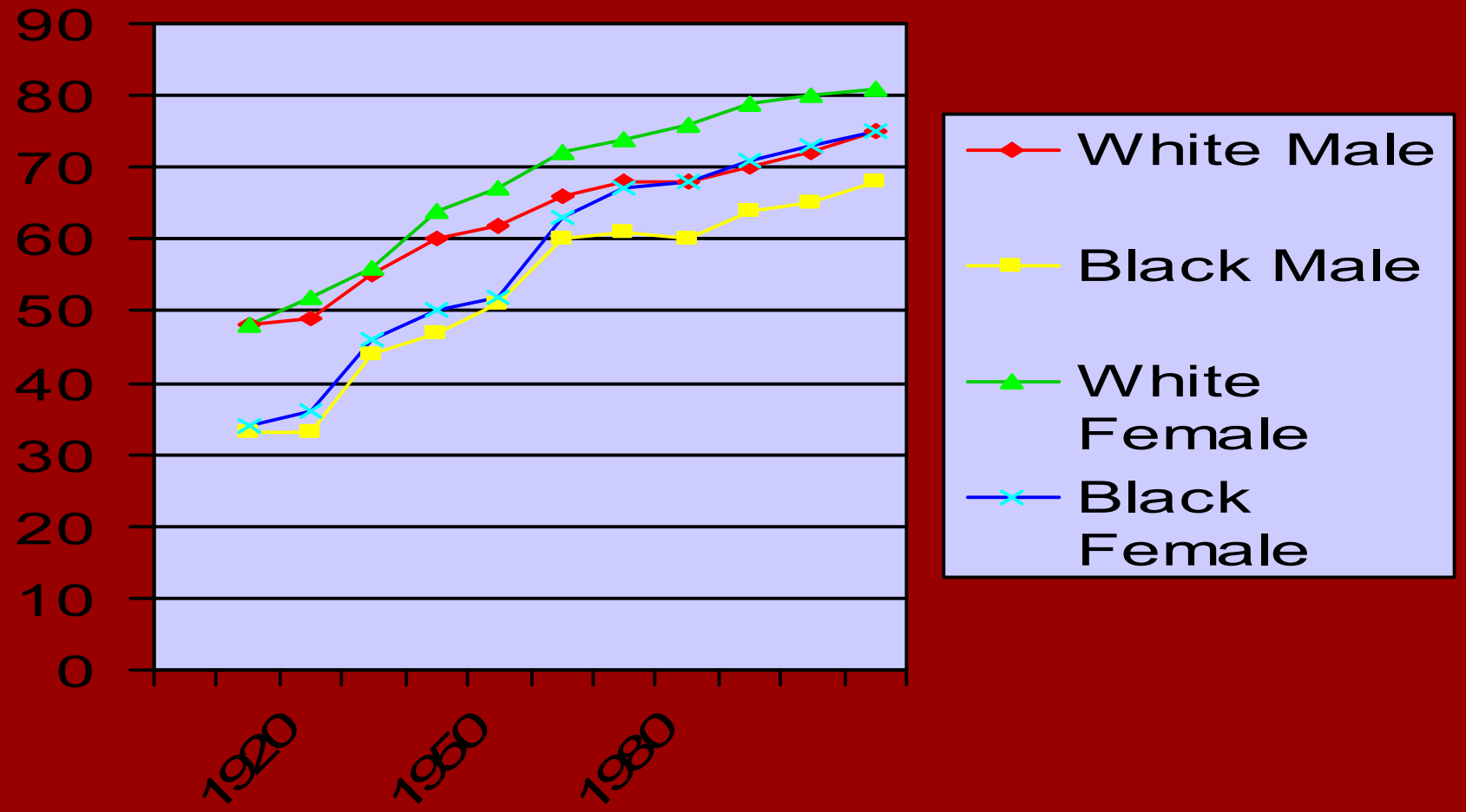
Center for Interdisciplinary Health Disparities Research
The University of Chicago

Age-Adjusted Mortality Rates by Race/Ethnicity and Gender, 2001



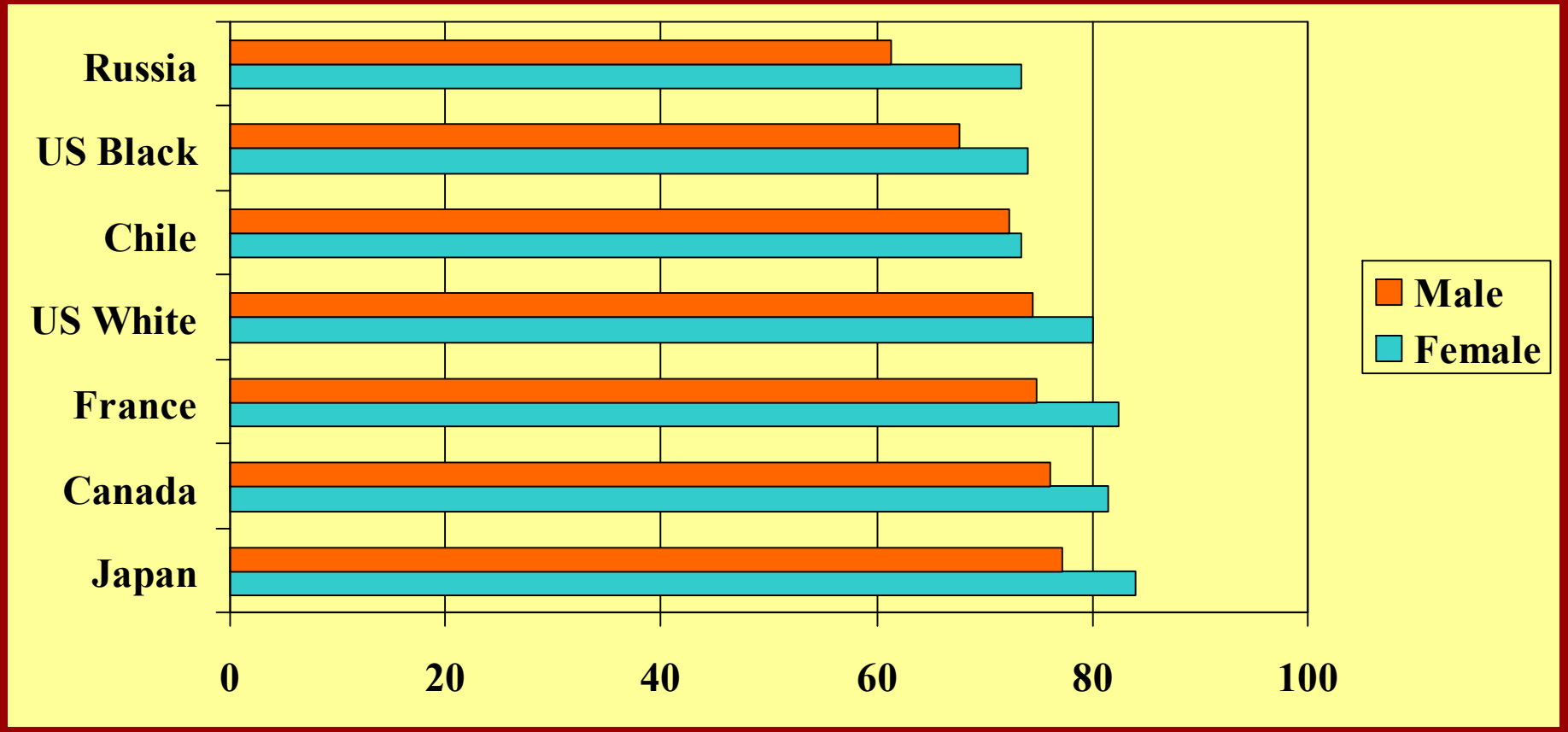
Source: National Center for Health Statistics Reports, Vol. 52, No. 3, Sept. 18, 2003, tabs. 1 & 2.

Life Expectancy at Birth for Black and White Males and Females in the US, 1900-2000



Source: National Center for Health Statistics, 2003, tab. 27

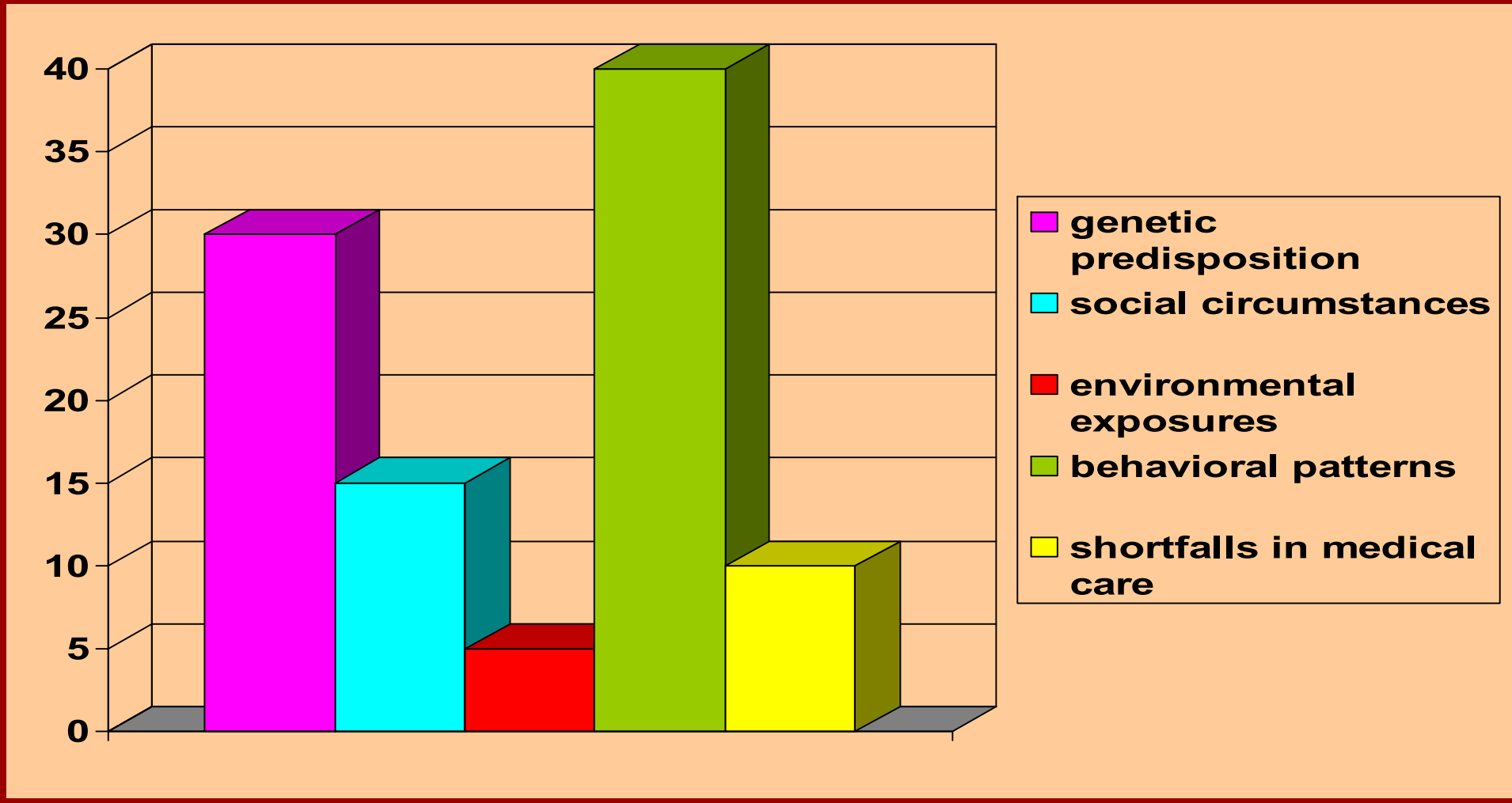
International Comparisons of Female and Male Life Expectancies, United States and Other Countries



Source: National Center for Health Statistics, 2003, tabs. 26 & 27

What do we know about determinants of health disparities?

A Framework for Understanding Health Disparities: The Impacts of Various Domains on Early Deaths in the United States



Source: McGinnis et al., 2002

Treated Separately Do Not Explain Disparities

Behavioral patterns (40%)-Smoking, diet, adherence, etc.

Genetics (30%)-Heritability and genetic propensity

Social circumstances (15%)-Discrimination, availability of services, etc. The least studied determinant, and perhaps most significant.

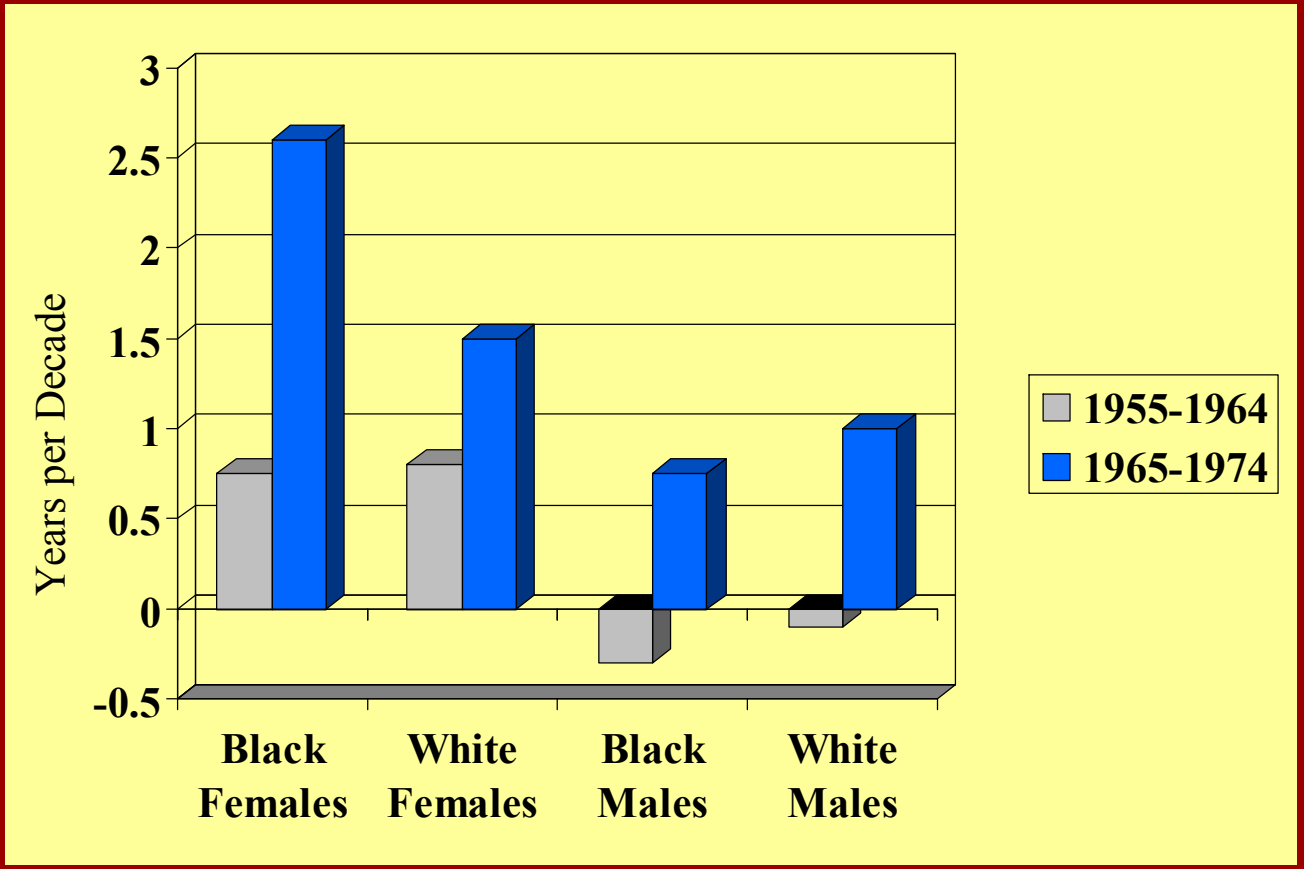
Shortfalls in medical care (10%)-Physician bias, access to care

Environmental exposures (5%)-Toxins, pollution, secondhand smoke, etc.

Treated Separately Do Not Explain Disparities

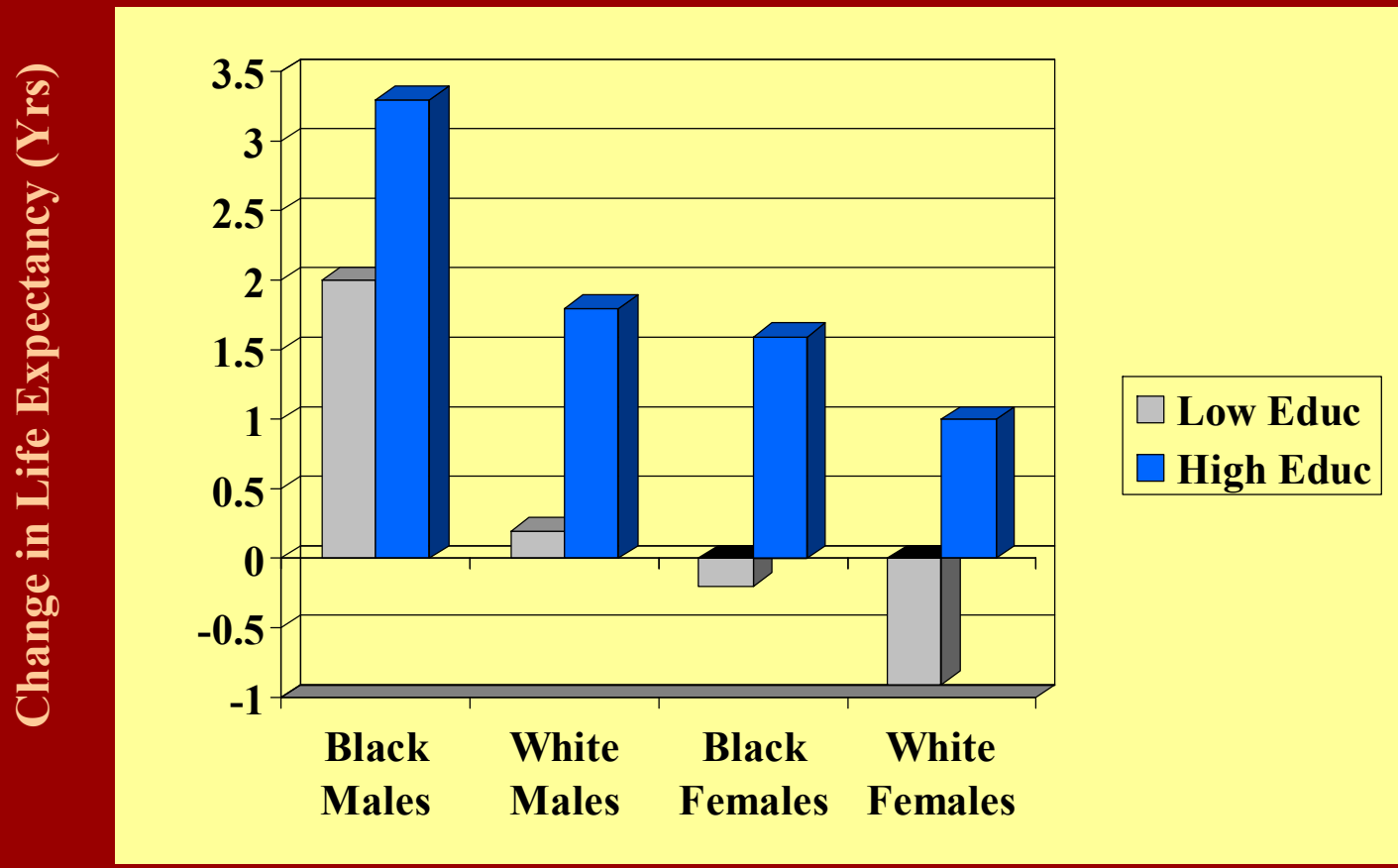
- We have focused on behavioral patterns (which can blame the victim) and genetics to the exclusion of social circumstances
- And, we have neglected interactions between determinants

Effect of the Civil Rights Act: Change in Life Expectancy at Age 35 Before and Afterwards



Source: Kaplan, Ranjit, & Burgard, 2008, p. 156

Change in Life Expectancy at Age 25 by Race, Gender, and Education: 1990-2000.



Source, Meara et al., 2008, p. 354

The Federal Response

Recognizing the complexity of diseases such as cancer and our lack of success to date in conquering them, the National Institutes of Health (NIH) in 2002 launched a new approach…

Roadmap for 21st-Century Medical Research

Dr. Elias A. Zerhouni, Director, The National Institutes of Health

"The NIH Roadmap… lays out a vision for a more efficient and productive system of medical research. It identifies the most compelling opportunities in three main areas:

1. new pathways to discovery,
2. research teams of the future, and
3. re-engineering the clinical research enterprise."

Roadmap for 21st Century Medical Research

Research teams of the future

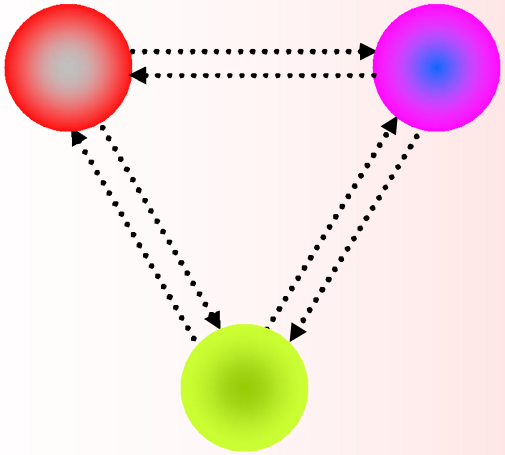
- new organizational models for team science
- novel partnerships of molecular, social, and behavioral scientists
- because, solving the problem of complex diseases like cancer requires a holistic understanding of the complex interplay between factors such as genetics, diet, environment, behavior, and social structures

Centers for Population Health and Health Disparities Initiative

- first implementation of the NIH Roadmap
- directed at group differences in health
- established 8 centers in the US, each with at least 3 interdependent research projects addressing biological, behavioral, and social aspects of health and partnering with community stakeholders

Research Teams of the Future

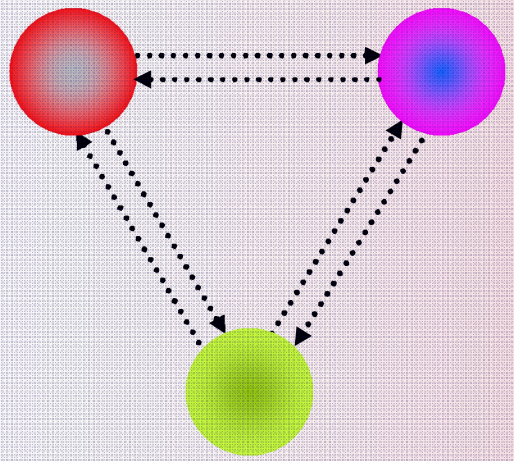
MULTIDISCIPLINARY



- Separate bodies of knowledge
- Different "languages"

Research Teams of the Future

MULTIDISCIPLINARY



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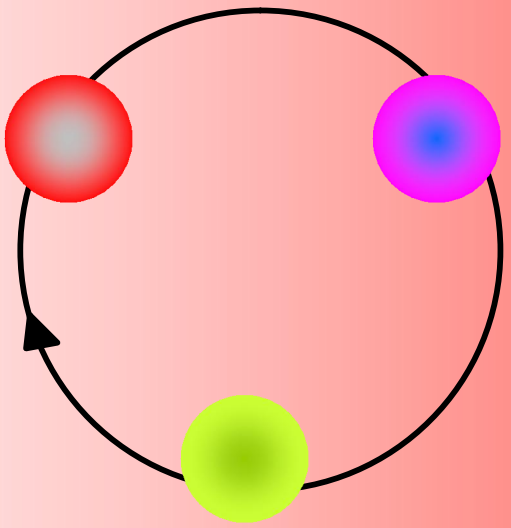
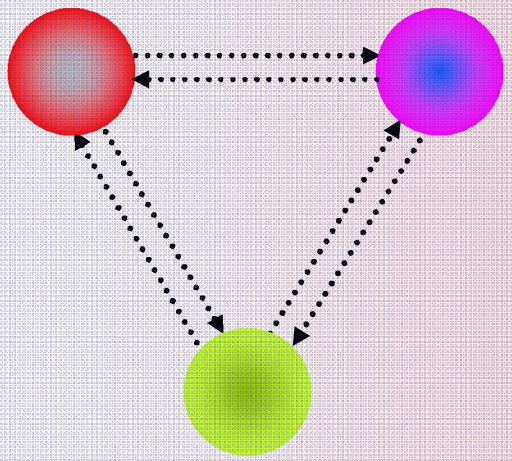
INTERDISCIPLINARY



- **Shared bodies of knowledge**
- **Shared "vocabulary"**

Research Teams of the Future

MULTIDISCIPLINARY



- Separate bodies of knowledge
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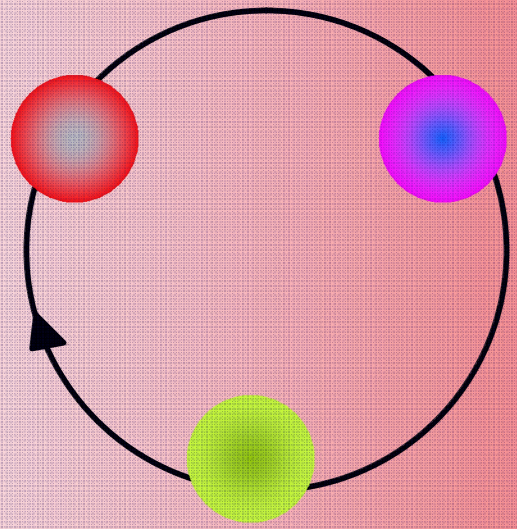


- Shared bodies of knowledge
- Shared "vocabulary"

TRANSDISCIPLINARY

- Shared language
- Pooled bodies of knowledge and theory
- Jointly-developed new methods

Disciplinary Network Ties Prior to (T1) and After (T2) NIH Funding

T1

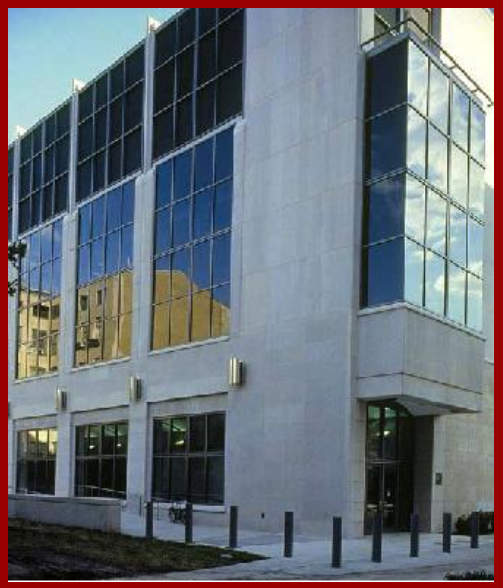
T2

Increase in density within centers 24% (UT) to 418% (UC)

Red=OSU	Orange=UIC
Dk Blue=Penn	Yellow=RAND
Pink=UC	Lt Blue=WSU
Gray=Tufts	Green=UTMB

Cancer Risk Clinic

Institute for
Mind and Biology



University of Ibadan

Center for Interdisciplinary Health Disparities Research

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Martha McClintock, Ph.D. , Co-Director — Department of Psychology
Suzanne Conzen, M. D. — Department of Medicine
Funmi Olopade, M. D. — Department of Medicine
Thomas Krausz, M.D. — Department of Pathology

CIHDR Central Research Questions

Why do African American women develop an earlier form of breast cancer that is more lethal and aggressive than that experienced by white women?

How does this contribute to the African American and white disparity in breast cancer mortality in the U.S.?

The level of disparity between African Americans and whites between 1990 and 1998

Indicator	U.S.
all-case mortality	narrowed
heart disease mort.	widened
stroke mortality	narrowed
lung cancer mort.	narrowed
br. cancer mort.	widened
infant mortality	narrowed
suicide mortality	widened

Source: Kessler, et al, 2002

Race Differences in Breast Cancer Mortality

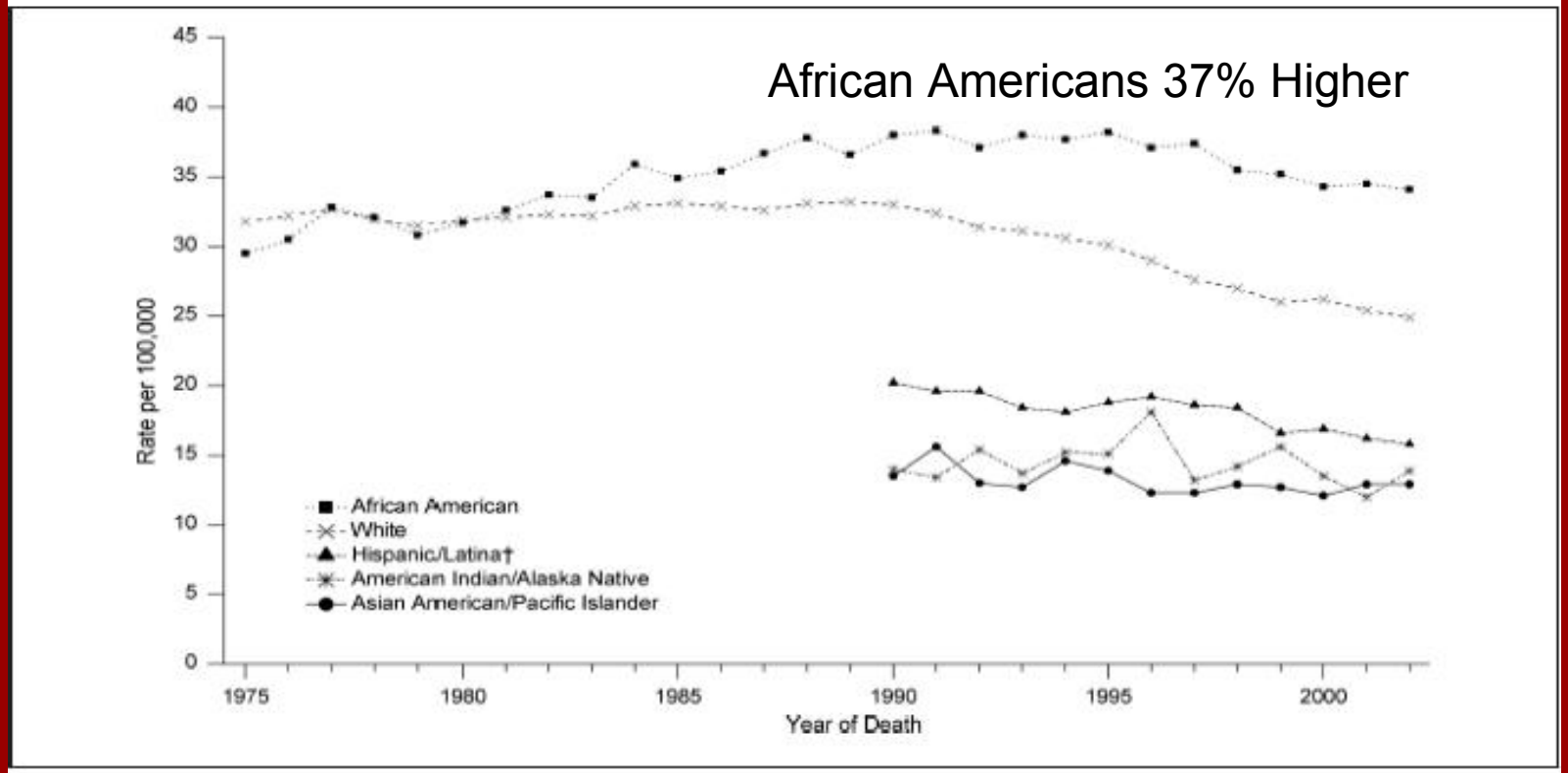
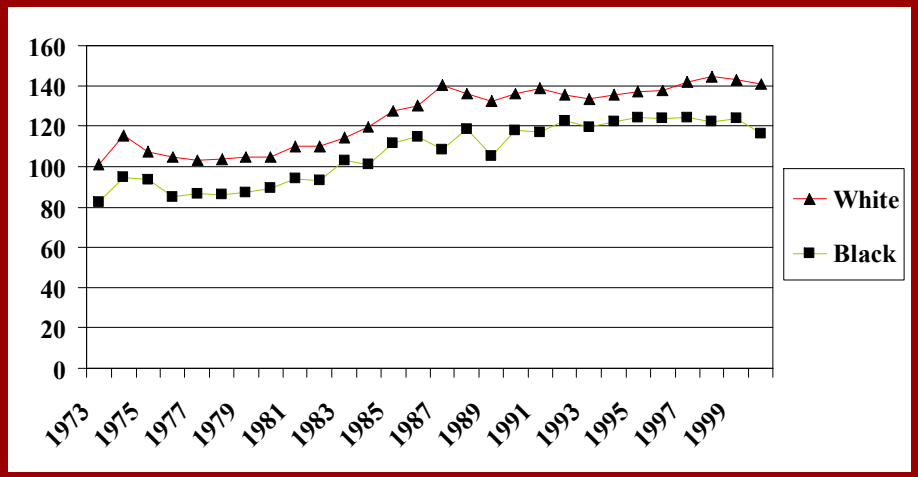


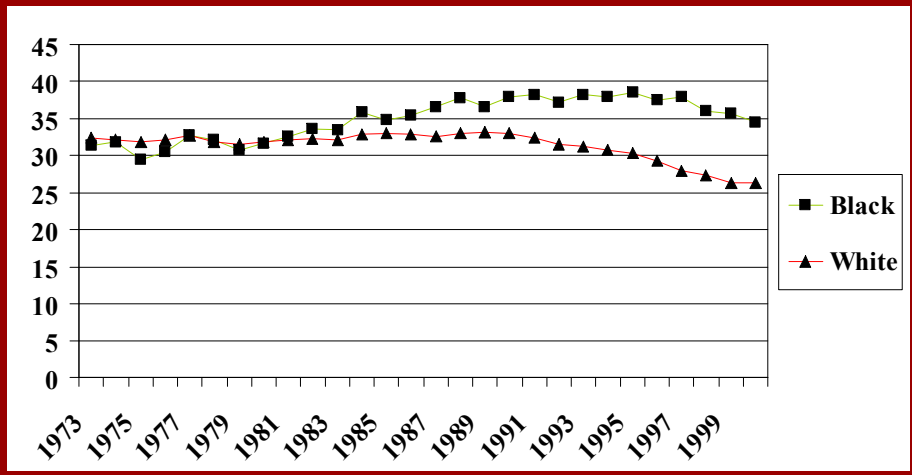
FIGURE 6 Female Breast Cancer Death Rates* by Race and Ethnicity, United States, 1975 to 2002.
*Rates are age-adjusted to the 2000 US Standard Population.
†Information is included for all states except Connecticut, Maine, Maryland, Minnesota, New Hampshire, New York, North Dakota, Oklahoma, and Vermont.
Source: National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

Black and White Age-Adjusted Breast Cancer Statistics, 1975-2000

Incidence



Mortality

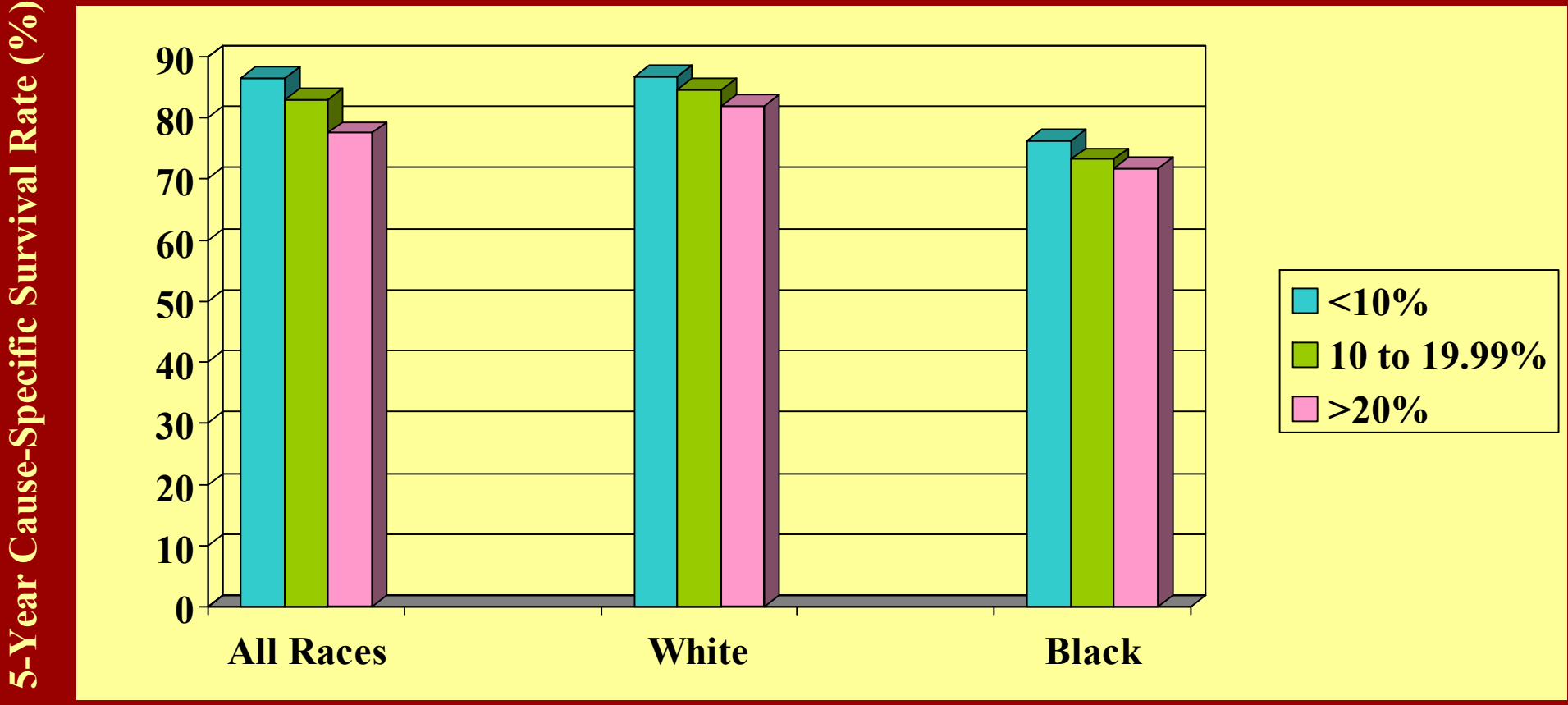


SEER Cancer Statistics Review, 1975-2000

Why the Worse Outcome?

Clearly much of the African American and white difference in mortality from breast cancer is due to differences in access to care.

Breast Cancer Survival by Percent of Census Tract Population Below Poverty Level (1990), 1988-1994 SEER Patient Cohort



Source: SEER Cancer Statistics Review, 1975-2000

Yet, 30% of Health Disparities Persist Even After Controlling for Access to Care……..

US Department of Defense Healthcare System (N=23,612; 2,428 Black), 1980-1999

"The survival of Black women compared to White women demonstrated an increasing ratio with calendar period"

"Thus, inequalities in access…most likely are not solely responsible for the widening disparities in outcome… (Jatoi, et al, 2003)"

Black Versus White Differences in Breast Cancer

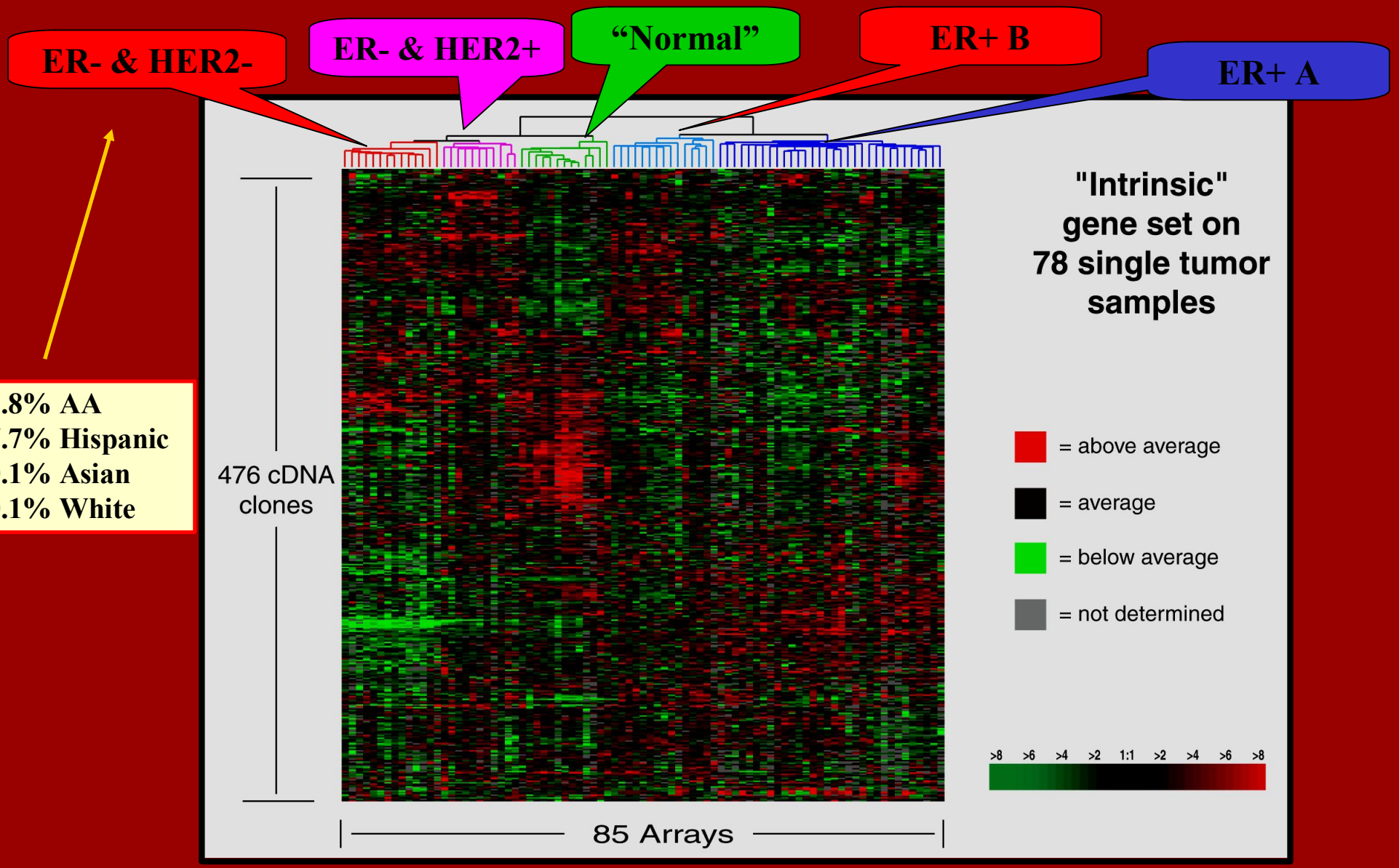
Among White women:

- the incidence of breast cancer increases with age after menopause

Among Women in West Africa:

- breast cancer is known as a disease of young women (av. age = 43 yrs)
- 74% of cases are pre-menopausal; 12% before age 30 yrs (14% before the age of 65 yrs. in White women; only 1% occurs before age 30 yrs.)
- it is almost always fatal

Breast Cancer Is Not One Disease



31.8% AA
17.7% Hispanic
10.1% Asian
10.1% White

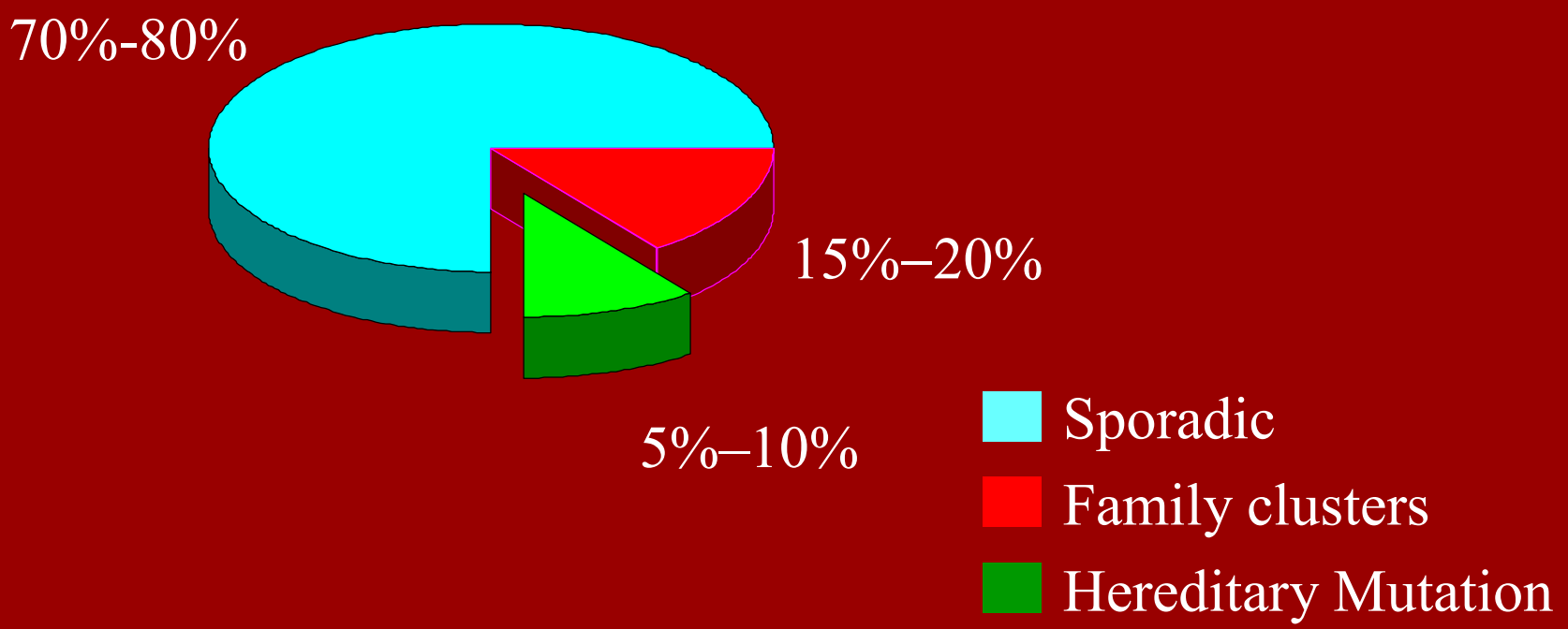
Source: Sorlie, et al., 2001

Molecular Characterization of Breast Cancer

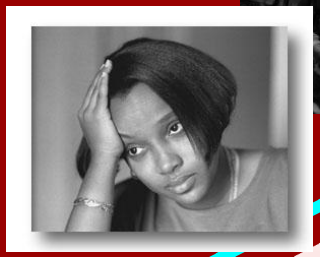
Hormone status	ER+	ER-	ER-
Age effected	Older Age	Younger Age	Younger Age
Molecular Character	Well-differentiated	High Grade	High Grade
Speed of growth	Indolent	Aggressive	Aggressive
HER2 Status	HER2-	HER2+	HER2-
Treatment	Tamoxifen	Herceptin	?


New York
UNITED STATES
New Orleans
Atlantic Ocean
Algiers
Fe Berber
Arab
Tunis
Tripoli
Arab
Cairo, EGYPT
Arab
MEXICO
CUBA
Mexico City
Kingston, JAMAICA
Berber
Hausa
Dafur
Fur
Arab
Malinke
Mossi
Yoruba
ETHEOPIA
Somali
BRITISH GHANA
DUTCH GHANA
Ivory Coast
Gold Coast
Slave Coast
CONGO
Masai
Swahili
Fang
Luba
Recif
PERU
BRAZIL
Bantu
ANGOLA
Mozambique
Shona
Khoisan
MADAGASCAR
Rio de Janeiro
Zulu
Cape Town
Buenos Aires
Montevideo
CAPE OF GOOD HOPE
Pacific Ocean
LA PLATA
Indian Ocean
AFRICAN SLAVE TRADE
Main sources of slaves

How Much of Breast Cancer is Hereditary?



Mutually Informative Multi-Level and Multi-Modal Approach



Projects 2 and 3

Olopade

Gehlert

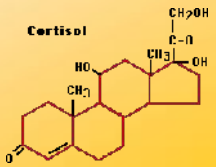
Projects 1 and 4

McClintock

Conzen

genes

hormones



psychological state

behavior patterns

social circum-stances

(social isolation, social support)

housing

environ-mental exposure

community/ neighbor-hood

(crime, collective efficacy, social ecology)

Mutually Informative Multi-Level and Multi-Modal Approach

Projects 1 and 4

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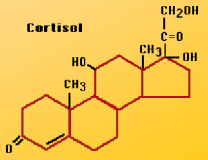
Conzen

genes

hormones



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(crime, collective efficacy, social ecology)

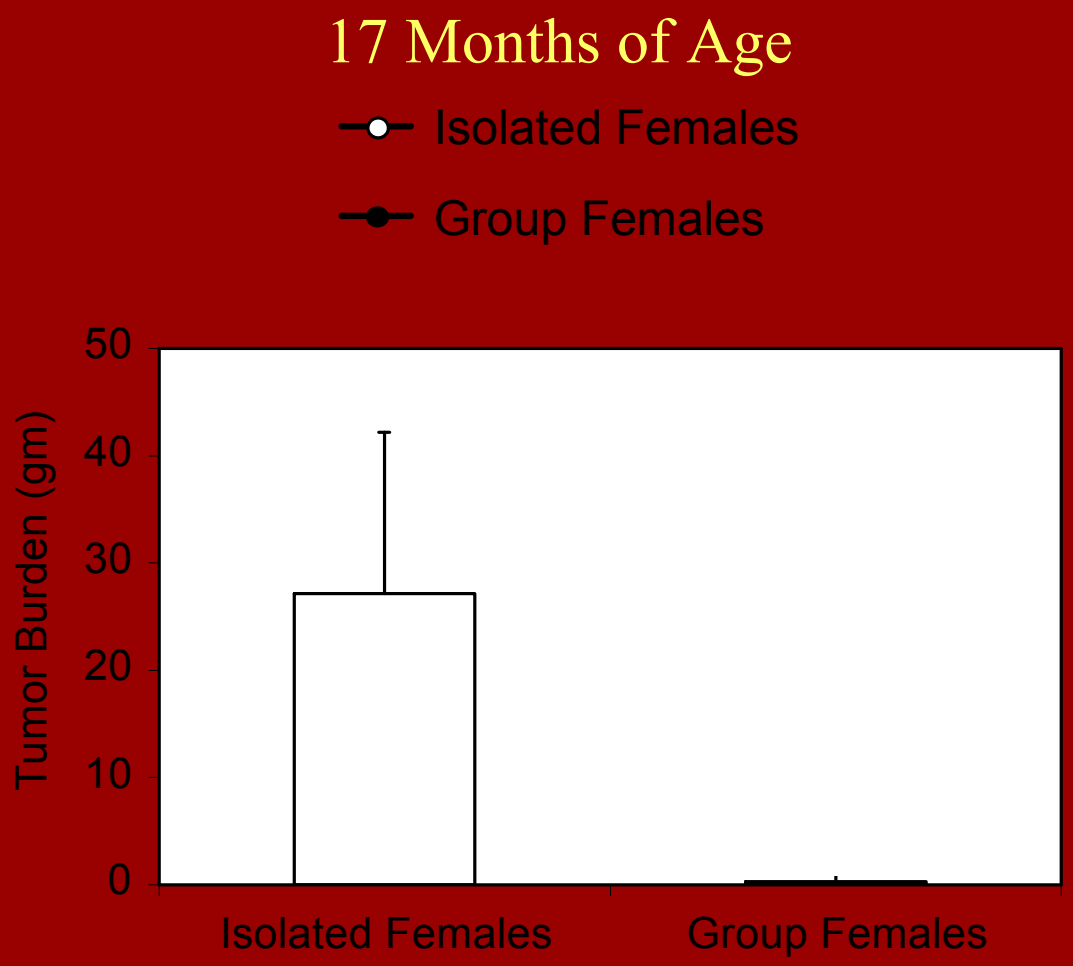
Project #1: Mammary Cancer Risk: Social Isolation and Acquired Vigilance (Martha McClintock, Ph.D.)

Acquired Vigilance
20 days of age

Isolated

Grouped

Total Tumor Burden



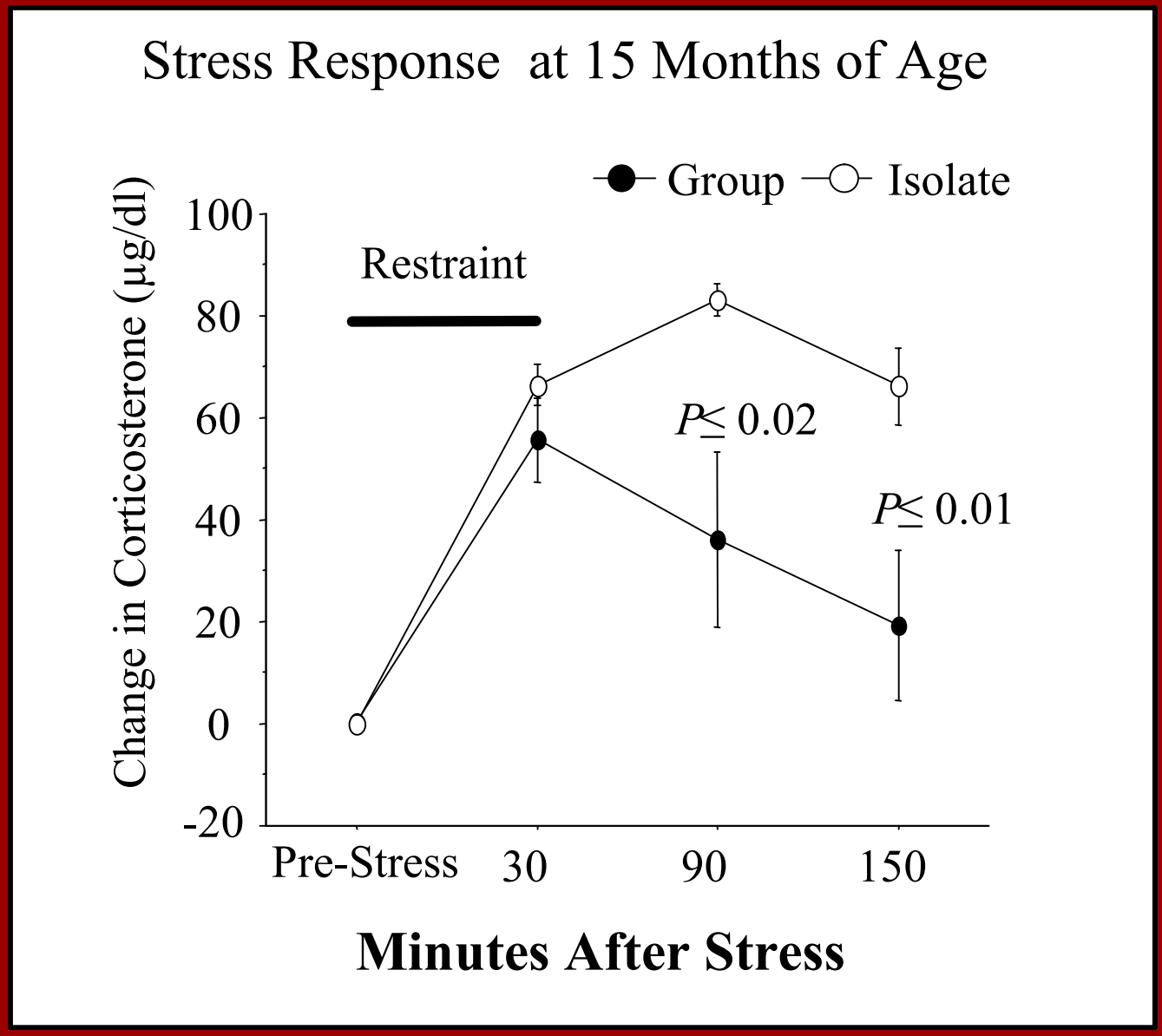
$p \leq 0.0001$

Litter Mates at 790 Days of Age

Social Group

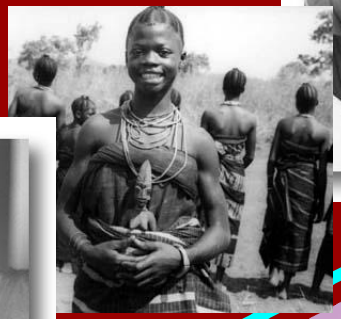
Isolated

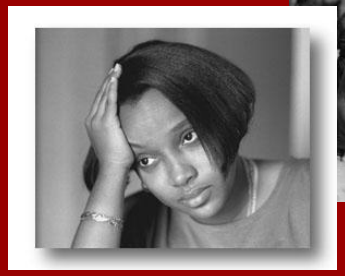
Corticosterone Dynamics 15 Months of Age



Baseline Rise Recovery Time

Mutually Informative Multi-Level and Multi-Modal Approach





Projects 2 and 3
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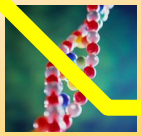
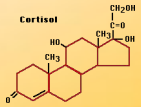
Olopade

genes



hormones



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social circum-stances

(social isolation, social support)

housing

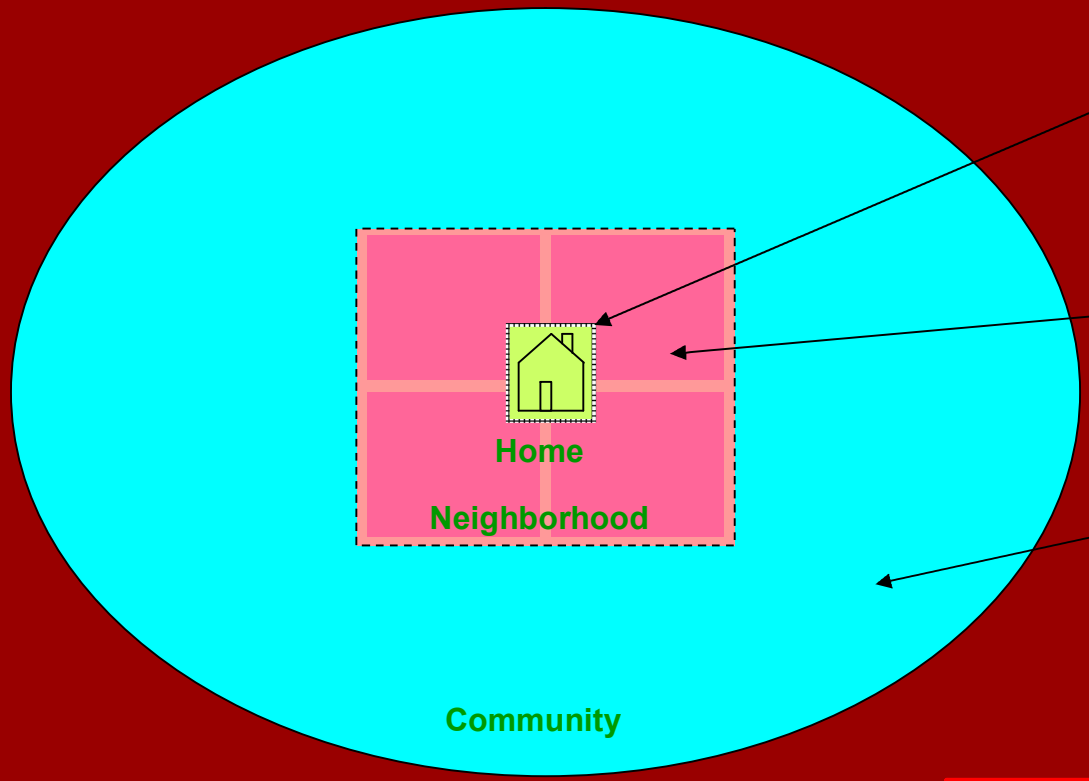
environ-mental exposure

community/ neighbor-hood

(crime, collective efficacy, social ecology)

Project #3: Multi-Level Sources of Psychosocial and Hormonal Data from the Same Newly Diagnosed Women

Two-day visits every 6 months for 1.5 years (10 visits/woman with >18 hours of face-to-face contact).



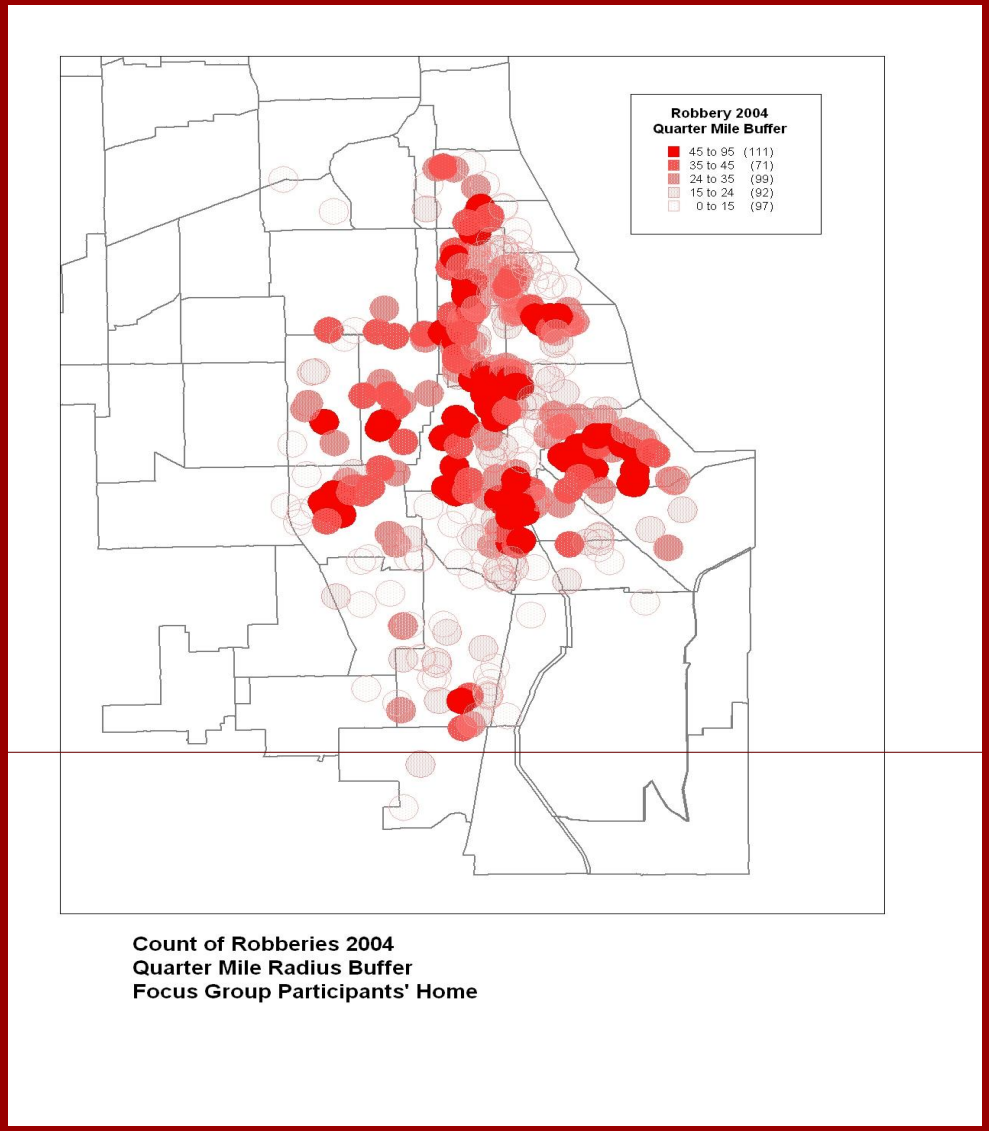
Home: (women interviewed in home) psychosocial functioning, social network, health behaviors, and salivary cortisol.

Neighborhood: (four block radius around home; Built Environment Team) opportunities for social interaction (vacant lots, traffic in neighborhood, vacant buildings).

Community: (geocoded data) violent crime, collective efficacy, dilapidation of housing, SES, trust, health indicators.

Olopade lab collects and analyses tumors from same women

Community: Robberies per ¼ Mile Buffer Around Participants' Homes

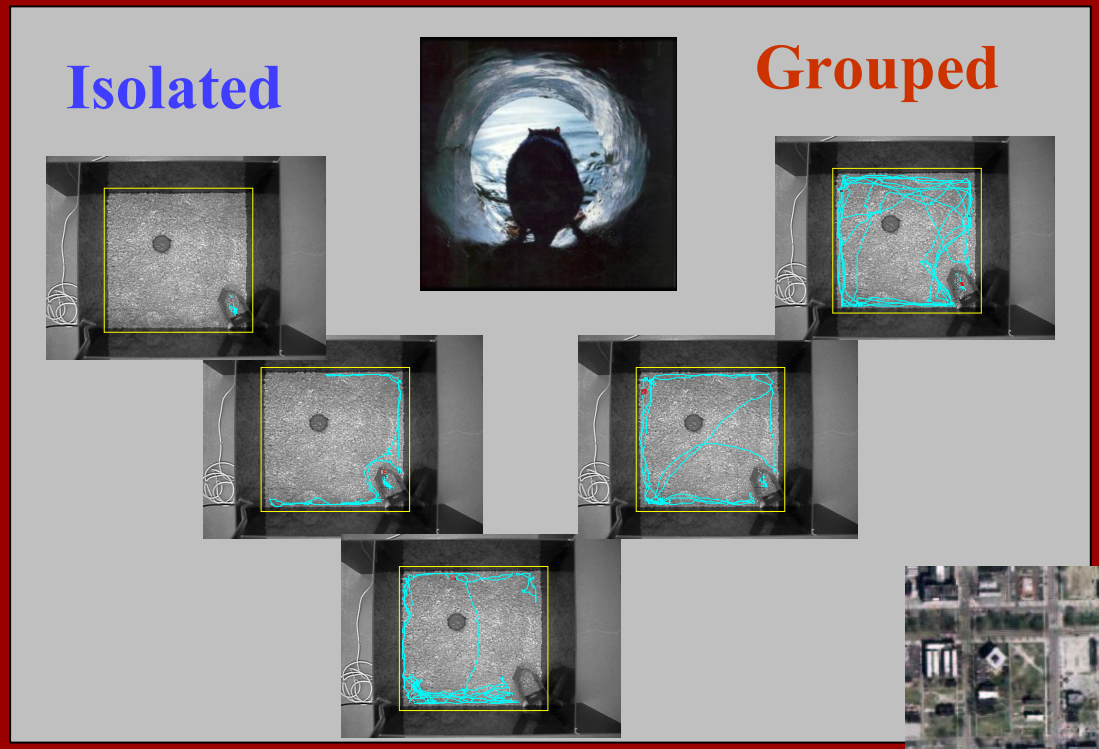


● = high

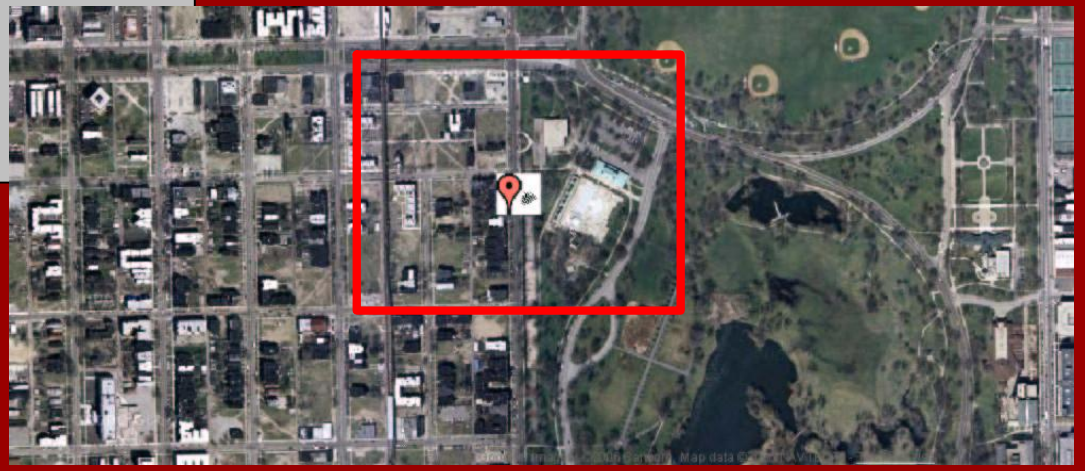
● = low

Range = 0-95
Mean = 32.1
(SD = 20.1)

Salient Psychological States: Vigilance in Environment

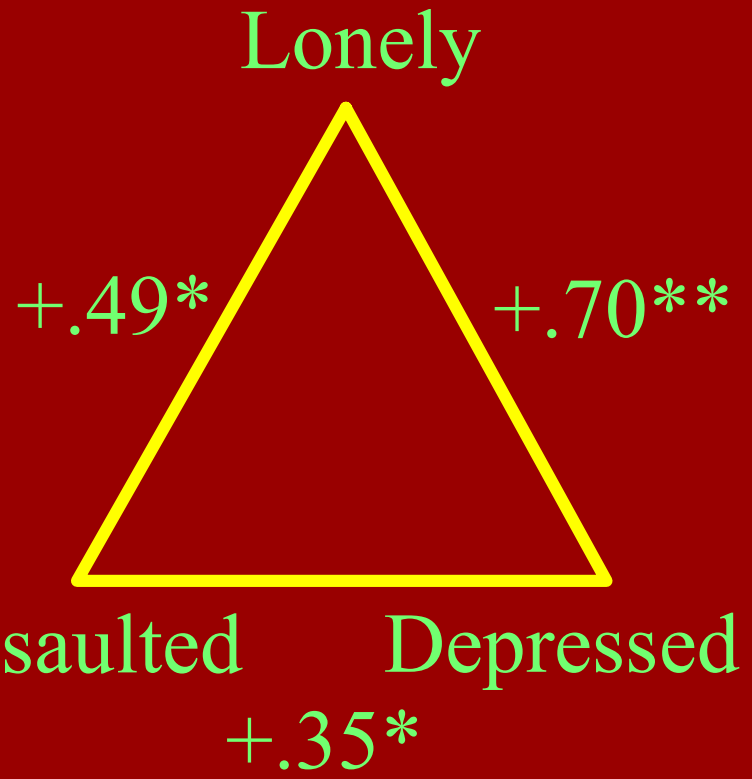


Neighborhood's Built Environment



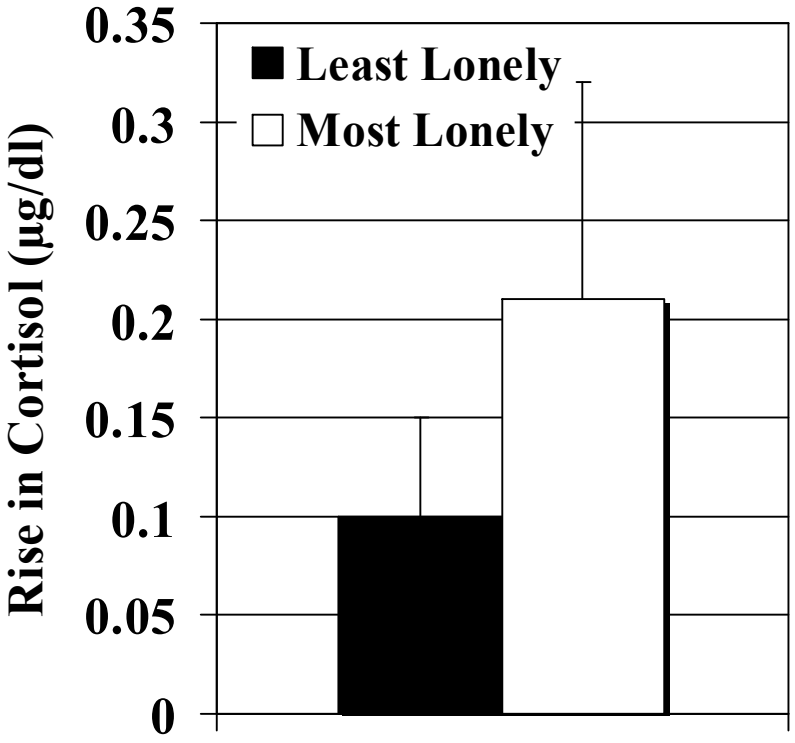
African American Women Newly Diagnosed With Breast Cancer

- Dislocation
  - 67% moved in past 10 years
- Felt Loneliness
  - Sample 5.1 ± 1.5 (SD)
  - Cook County 4.2 ± 1.3 (SD)
- Depression
  - 22% clinically depressed
- Sexual Assault
  - 34% suffered an assault

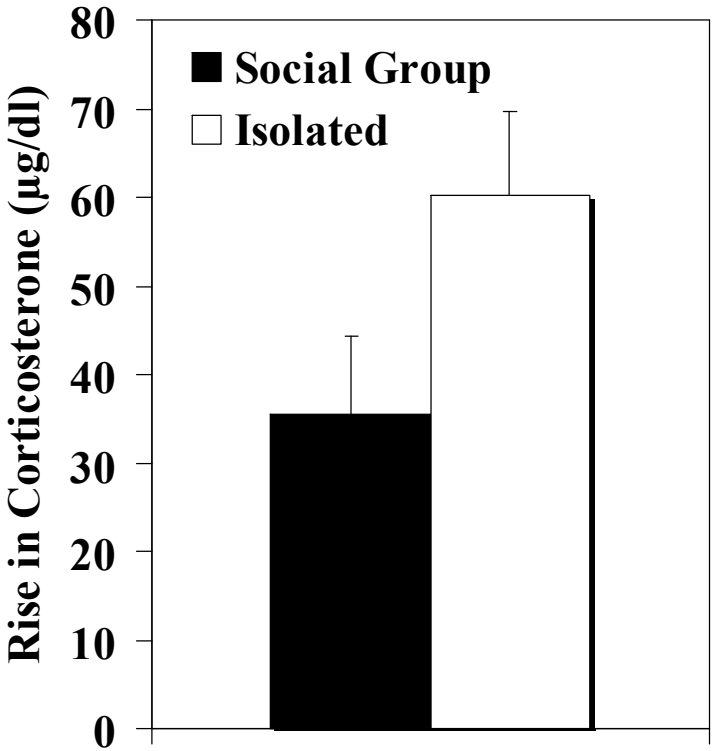


*p=0.00, **p=0.01

Stress Reactivity



African-American Women
Awakening To Life Stressors
$r = 0.48, p = 0.007$



Sprague-Dawley Rats
30 minute Restraint Stressor
$p = 0.02$

CIHDR Model of Health Disparities in Breast Cancer

Race = Poverty, Neighborhood Crime, & Frequent Moves

Isolation, Acquired Vigilance & Depression

***GR, Pten,* inflammatory gene function**

Failure of Apoptosis & Tumorigenesis

Social

Genes

Center for Interdisciplinary Health Disparities Research

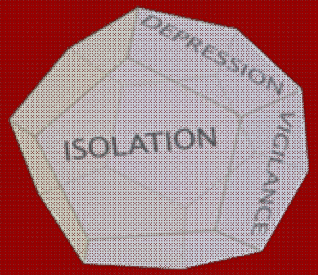
Fractured Community | Crime | Dilapidated Housing

African-American Women (Chicago)

Sexual Assault

+

P =.03



2-factor psychosocial suite:
1. depression and loneliness
2. anomie

+

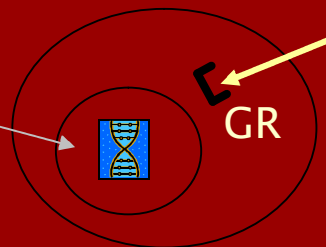
P = .05

Inflammatory Process ⟷ Cortisol Dynamics

Rise
Night time

Breast Cancer

Downregulation
Pten, Axl
Inflammatory genes



GR Glucocorticoid Receptors

The Message for Social Work

- We have taken a holistic approach to social work practice, but not to social work research
- Realizing how intervening at one level impacts levels downstream has important implications
- That upstream and downstream determinants are linked to one another helps us to target interventions to maximizes resources and predict their effects

CIHDR Transdisciplinary Team

INTERNAL STEERING COMMITTEE

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T Krausz, MD, Surg. Pathology

M Tretiakova, PhD, MD, Surg. Path.

M McClintock, PhD, Psychology

C Masi, MD, PhD, Gen. Int. Med.

Absent: S Conzen, MD, Hem/Oncology

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